

Claims:

1. A substrate positioning device for positioning a substrate within a substrate scrolling display having a display window, a substrate storage tube for storing the substrate and a motor driver coupled to the substrate storage tube for scrolling the substrate, such that a display art frame on the substrate is positioned within the display window, said substrate positioning device comprising:

(a) a rotary encoder coupled to the substrate storage tube for detecting the rotary position of the substrate storage tube;

(b) a controller coupled to said rotary encoder comprising:

(i) a memory for storing the rotary position of the substrate storage tube that corresponds to the position of the substrate when the display art frame is positioned within the display window;

(ii) a processor coupled to said memory programmed to access said rotary position in response to a request to display the display art frame within the display window;

(c) a display interface coupled to said controller for instructing the motor driver to rotate the substrate storage tube such that the display art frame is positioned within the display window.

2. The substrate positioning device of claim 1, wherein the display art frame contains first and second frame markers, and further comprising first and second frame sensors coupled to said controller for detecting said first and second frame markers, said processor being programmed to determine the rotary position of the substrate storage tube that corresponds to the position of the substrate when the first and second frame markers of the display art frame are detected and to store said rotary position in said memory.

3. The substrate positioning device of claim 1 wherein said rotary sensing device is a quadrature device.
4. The substrate positioning device of claim 2 wherein said first and second frame sensors are optical sensors, each comprising two infrared emitting diodes and an infrared receiver.
5. The substrate positioning device of claim 2 wherein said first frame marker is located at the top of the display art frame and the second frame marker is located at the bottom of the display art frame.
6. The substrate positioning device of claim 1 wherein said motor interface provides the signal in RS485 format.
7. The substrate positioning device of claim 1 wherein said motor interface provides the signal in RS232 format.
8. A method for positioning a substrate within a substrate scrolling display having a display window, a substrate storage tube for storing the substrate and a motor driver coupled to the substrate storage tube for scrolling the substrate, said method comprising the steps of:
 - (a) providing a substrate with a display art frame within said substrate scrolling display;
 - (b) storing the rotary position of the substrate storage tube that corresponds to the position of the substrate when the display art frame is positioned within the display window;
 - (c) retrieving said rotary position in response to a request to display the display art frame within the display window;
 - (d) adjusting the rotary position of the substrate storage tube such that the display art frame is positioned within the display window.
9. The method of claim 8, further comprising the additional steps of:

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(e) applying first and second frame markers to said display art frame;

(f) detecting first and second frame markers such that the display art frame is positioned within the display window;

(g) determining the rotary position of the substrate storage tube when the first and second frame markers have been detected for storage and retrieval in steps (b) and (c).

10. The method of claim 8, wherein step (d) comprises instructing the motor driver to rotate the substrate storage tube.

11. The method of claim 10, wherein the motor driver is instructed using a signal in RS485 format.

12. The method of claim 10, wherein the motor driver is instructed using a signal in RS232 format.

13. The method of claim 9, wherein step (f) comprises detecting said first and second frame markers using optical sensors.

14. The method of claim 9, wherein step (g) comprises detecting the rotary position of the substrate storage tube using a quadrature rotary encoder.

15. The method of claim 9, wherein said first frame marker is located at the top of the display art frame and the second frame marker is located at the bottom of the display art frame.

16. A display art substrate assembly for use within a scrolling substrate display, said display art substrate assembly comprising:

(a) a substrate having a first coefficient of expansion and a first resistance to deformation, said substrate being adapted to be moveable within said scrolling display; and

(b) a removeable display art sheet for attachment to said substrate, said removeable display art sheet having a second coefficient of expansion which is substantially equal to the first coefficient of expansion of said substrate and a second resistance to deformation which is substantially equal to the first resistance to deformation of said substrate;

such that when said removeable display art sheet is brought into close contact with said substrate, substantially identical stresses are produced within said substrate and said removable display art sheet and substantial cling adhesion is produced therebetween.

17. The assembly of claim 16, wherein said substrate has an optical opacity rating of substantially 0.6%.

18. The assembly of claim 16, wherein said removeable display art sheet is comprised of a base, an ink receptive top coating positioned on top of said base and a cling film backing positioned under said base which is adapted to adhere to said substrate.

19. The assembly of claim 16, wherein said substrate is comprised of antistatic polyester film.

20. The assembly of claim 16, wherein said removeable display art sheet is comprised of antistatic polyester film.

21. The assembly of claim 16 in combination with a tool having a soft surface for removing air bubbles from between said substrate and said removeable display art sheet.

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